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ABSTRACT

Intended for parents of children with cleft lip and cleft palate, the booklet provides an overview of the condition. Addressed are the following topics (sample subtopics in parentheses): prenatal development and birth defects (facial development); possible causes of cleft lip/cleft palate (common misconceptions, genetic factors, environmental influences); normal lips and palates; surgical repair (plastic surgery, prostheses, speech aids); eating problems; speech (stimulation techniques, speech therapy); effects on intelligence; hearing loss (otitis media); dental problems (malocclusion); and effects on children's personalities. Four sources of information are listed, and a glossary of 57 terms is appended. (CL)

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BRIGHT PROMISE

For Your Child With Cleft Lip and Cleft Palate

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Revised Edition

by

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and
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The National Easter Seal Society for Crippled Children and Adults

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FOREWORD

It is a common observation that several persons witnessing the same event will give different descriptions of what occurred. Similarly, several persons reading the same written material often arrive at different interpretations of the author's intent and experience different emotional reactions to what they read.

Since publication of the first edition of this booklet,* many parents of children born with clefts have written about the help they felt it provided.

One mother wrote, "It is very difficult to find the right words to express how much help this little booklet has been to us. I read it aloud to Frank on our way home from the clinic, and it answered every question we had asked ourselves over and over. We feel indebted to you and your co-workers for being so interested in helping us as parents to understand our problem and for writing it in the type of language that ordinary people can understand. We plan to sit down with our families and friends and read this booklet to them so that they will know and understand Jayne's problem and in that way help her too. I think it would be a wonderful thing if hospitals had a few copies so that a new mother who has a child with a cleft can read this and save herself and family days and weeks of uncertainty as to what can be done for the baby and feel reassured that the best people in the medical profession are doing their best to do what is right for the child."

These parents, like most who have written, had found in *Bright Promise* what the author intended: Information to answer common questions and to give reassurance that, with the quality of treatment now generally available, children with clefts can lead happy, useful lives.

**For Your Child with Cleft Lip and Palate. . .Bright Promise,* by Eugene T. McDonald, Ed.D., published by the National Easter Seal Society for Crippled Children and Adults, 1959.

Not all parents, however, had these positive reactions. To guide us in revising *Bright Promise,* we sent a questionnaire to a sample of parents selected from memberships in parents' groups identified by a committee of the American Cleft Palate Association.

One mother described her reactions on reading *Bright Promise* in this way, "I found *Bright Promise*, upon my first reading, to be cloying and maudlin. The second time it was touching and not particularly enlightening. The third and fourth times I found it perhaps of use—but for someone else. It did not meet my personal needs, but I do provide it for new parents." A key part of her comment is that the booklet "did not meet my *personal* needs." This mother also commented, "Personally, I was in a stage of *denying* my own emotional responses until my child was about a year old."

Clearly, the emotional state of fathers and mothers will influence how they react to what they are told by professional workers, how they interpret what they read about cleft lips and palates, and how they respond to their child and to each other. To some degree the emotional state of parents of children born with clefts is related to the kind of information they have regarding causes, management, and prognosis. It is to these topics that this booklet is addressed.

What will your reactions be as you read this booklet? Obviously, the authors can't predict how you will feel. In our experience, booklets of this type are most helpful when used as a basis for discussion with professional members of a team of specialists organized to provide treatment for children with clefts. Parents have also found *Bright Promise* helpful when used as a basis of discussion with other parents, within the immediate family, and with friends and other relatives.

—E.T.M.
—A.J.B.

BRIGHT PROMISE

Because the future for a child born with a cleft appears so bright, no need was seen to make alarming or pessimistic statements in this booklet. If some statement arouses anxiety, parents are advised to discuss the statement with one of the professionals who works with them and their child.

On the other hand, parents are cautioned against thinking that no child will have a visible scar following lip surgery or that every child will develop perfect speech. Parents seeking such perfection are doomed to unhappiness, for their eyes will naturally exaggerate even the tiniest scar and their ears will detect speech differences that others ignore.

Concentration on slight differences in appearances and speech may lead parents to overlook the fact that intellectual and motor abilities are distributed among persons with clefts as among the general population. Physical appearance and speech development are now quite well managed by specialists. To a large extent the child's emotional development—which will influence how well intellectual and motor abilities are used—will be shaped by parental reactions to the child's cleft. In contrast to some developmental disabilities that are not apparent at birth, a cleft lip and/or cleft palate will be obvious the first time a parent sees the child. Emotional reactions, therefore, occur early and progress quickly as indicated in the following anecdotes:

"When John was born, I walked the streets the rest of that night, all the next day, and far into the next night." The man speaking was the father of a four-year-old boy with a cleft lip and cleft palate.

"Can you tell me what you were thinking about as you walked around?" asked the psychologist.

"I wondered," said the father, "about what a cleft palate was, what caused it, how I would tell my wife that our boy wasn't normal, and where we'd get the money for his care. I wondered why this had happened to us and what my wife's parents and

my parents and the neighbors would think. After a while I got to wondering what the baby would look like or if he would be O.K. like the doctor said."

The worries, the fears, the confusion of John's father are common experiences for parents of children with cleft palates. A tearful young mother once told us, "I have so much here inside me, and I know I'd feel better if I could talk about it, but I just can't let it come out. I don't know whether I can't find the right words or whether I'm afraid it will hurt too much to hear myself telling how I feel. I think sometimes I'm afraid of the answers I might get."

In this case, the psychologist encouraged the young mother to talk out the problem with her husband, with the parents of other children who have handicaps, and with the professional people taking care of her child. At first the woman found it hard to describe her feelings, but once started, the words came easily.

Talking things over with a group of other parents whose children were born with cleft lips or cleft palates proved especially helpful. The more she learned about the possible causes of cleft palates, about what it means to have a cleft palate or cleft lip, about how her child might be affected, about what could be done and how she and her husband could help, the better she felt.

Human beings have always feared what they do not understand and have a natural tendency to magnify the unknown. As understanding increases, confusion and fears diminish. Thomas Mann understood this point in *The Magic Mountain* when he wrote, "Order and simplification are the first steps toward the mastery of a subject—the actual enemy is the unknown."

The purpose of this booklet is to discuss the questions that came to the mind of John's father as he walked the streets and to answer as well those unasked questions that hurt more because they are unspoken. Perhaps this booklet can bring "order and simplification" for dispelling the fear and worry caused by the unknown.

PRENATAL DEVELOPMENT AND BIRTH DEFECTS

It has been estimated that, each year, more than 250,000 babies are born with some type of congenital abnormality (birth defect). Cleft lip and/or cleft palate is but one of many defects that may be present at birth. Some others are cerebral palsy, clubfoot, dislocation of the hip, spina bifida, heart defects, mental retardation—to name a few. To further their understanding of how and why congenital abnormalities occur, scientists are studying development from conception to birth.

Prenatal Development

The story of prenatal development is fascinating. Briefly, scientists have learned that when a single-egg cell from the mother is penetrated by a sperm from the father a set of instructions for producing a living organism is established. These instructions are carried on the forty-six chromosomes found in each human cell. At the time of conception twenty-three chromosomes are contributed by the father through the sperm and twenty-three from the mother through the egg cell. (As we will see later, some clefts may occur in response to the type of instructions carried on the chromosomes.) The single-egg cell, called an "ovum," after fertilization by a sperm, soon divides into two cells, then these two split into four; the four divide again to make eight cells, the eight divide to make sixteen, and so on. It is estimated that forty-four successive divisions occur between conception and birth and, when ready for delivery, the infant is composed of trillions of cells.

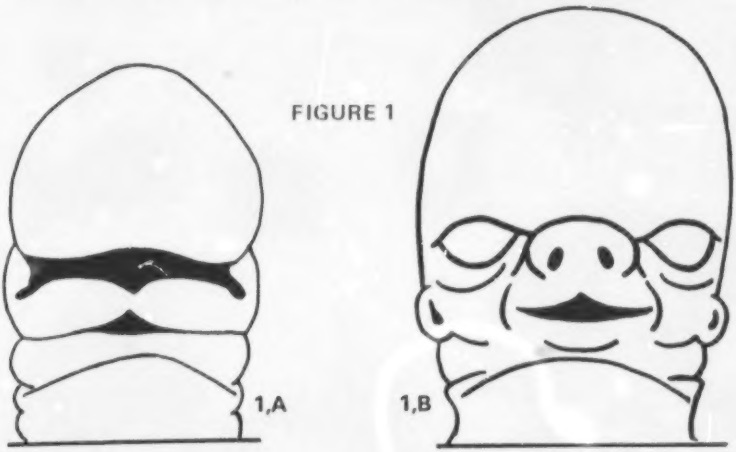
In the development from one to trillions, the cells do more than divide—they develop differential and unique characteristics. Some cells form muscles and bones, others become organs, and still others group to become the brain, spinal cord, nerves, and sense organs. Prenatal development follows a definite timetable, with the entire body plan and organs completed within the first three months. The remaining six months of intrauterine life are devoted to growth. Each body part appears at a definite time, and its stages of growth and development are triggered and controlled by the action of highly specialized chemical substances that are manufactured at the appropriate time by the

developing body. (Again, as we will see later, clefts might occur as a result of interference with these biochemical functions.) Scientists know enough about the timetable of prenatal development to determine, from the nature of the congenital abnormality, the approximate time when the developmental process was disturbed.

Facial Development

Of particular interest to parents of children with cleft lips and cleft palates is the manner in which the face develops. As adults, we regard our faces in different ways. Movie stars consider their faces to be their fortunes, but most of us more sensibly agree with Oliver Wendell Holmes, who wrote, "i have always considered my face as a convenience rather than an ornament."

FIGURE 1



Whether faces later become ornaments or conveniences, they have very plain beginnings. By the end of the first month (see Figure 1,A), there is at the head end of the embryo a wide hole that will become the mouth and a bar below it that will become the lower jaw. There is no nose, but only two small pits that will later become the part of the nose that smells things. The eyes are present only as bulges on the sides of the head, and the ears are simply tissue that will develop later. If a face is to be a fortune, it is very poor at this point because it certainly does not look like much.

During the second month the face develops rapidly. The lower jaw is formed from the bar that was present earlier, and the upper jaw is formed from tissue that grows forward from the angles of the mouth. The nose also develops at this time, with part of the tissue growing downward to form the central part of the upper lip. At about the end of the second month, this central part joins with the parts that grew forward from the angles of the mouth to make the upper lip complete (see Figure 1,B). Anything interfering at this time with the union of the middle and side parts of the lip produces a cleft lip.

Just as the face is not formed in one piece at the start, neither is the roof of the mouth. First the sides of the upper jaw form, at this time with an opening in the middle. The front part, which will hold the teeth, unites at the same time as the lip. The palate then forms from the sides of the upper jaw, which first grow downward then swing upward toward the middle of the mouth. The sides meet first in the front of the mouth, where they unite. Gradually this union occurs all along the roof of the mouth until, by the end of the third month, the roof of the mouth is closed completely. If something interferes early with this fusion of the sides of the upper jaw, the baby is born with a cleft extending throughout the length of the palate. When part of the roof of the mouth has been completed before the disturbance occurs, the child is born with only a partial cleft of the palate.

Thus, cleft lips and cleft palates seem to result from the persistence of clefts that were normal at certain early stages of development or from failure of permanent tissue to maintain the closures.

WHAT MIGHT CAUSE CLEFT LIP/CLEFT PALATE?

Some Common Misconceptions

At a meeting of a group of parents of children with cleft palates, the mothers decided to talk about the causes of their children's handicaps.

One mother began, "I think you can want a child too much. We had two boys, and my husband and I desperately wanted a girl. Because we had so much wanted a girl and didn't want any more boys, we were given a boy with cleft palate."

Another mother said, "I know exactly what you mean. We had two girls and felt just the way you did, so we got a girl with a deformed mouth. It isn't right to want a boy or a girl too much."

A long pause followed, and the psychologist inquired, "Are there some other things you have thought about as possible causes?"

"I fell while I was carrying Ann, and when she was born she had a cleft palate and a cleft lip," one mother volunteered cautiously.

An older woman, who had been listening quietly, began in a tentative manner, "I wonder if it is fair to blame God for our children's handicaps. If he wanted to punish us, I think he would do it directly and not punish little children. People a long time ago used to blame God for everything—famines, plagues, floods. Everything they didn't understand they said was God's way of punishing them. When people learned more about farming, they learned how to prevent famines. Doctors know what causes diseases so we don't have plagues like they did in olden times. Today we are building dams to prevent floods. Now we don't have to blame God for famines, plagues, and floods because we know more about them. When we don't understand what causes something, it's natural to think that there's a supernatural reason for it."

This discussion is typical of many that take place when parents talk about causes of cleft palate and cleft lip. As discussions progress, parents often come to realize that just as study and research have led to a better understanding of many other problems of humankind, scientific investigation can shed some light on the causes of congenital abnormalities. Many parents have reported that their difficulties seemed less hopeless when they learned that scientists not only have been studying these problems, but also know much about them.

Is Cleft Lip/Cleft Palate Inherited?

Professionals working with patients who have clefts know of some families in which there are individuals with clefts in every generation. In these cases the probability of inheritance is strong, but it should be noted that the majority of parents who have a child with a cleft report no history of other clefts in the family. It is difficult to know exactly how great a role inheritance plays in the appearance of clefts because no simple genetic pattern is evident. Certainly inheritance seems to be a primary cause in a small percentage of cases; many researchers believe the true number may be larger, but is obscured by the need to have several factors operating at the same time to result in a cleft. In some cases this may mean the involvement of several different genes or the effect of outside threats on an individual who is predisposed to have a problem. If there are degrees of predisposition that can be the result of inheritance, some children would be more vulnerable than others to potential cleft-causing factors. At present there is no way to know which parents with no history of clefts in the family may transmit to their offspring this predisposition to have a cleft.

Is Cleft Lip/Cleft Palate Due to Factors in the Environment?

Parents are aware of the increasing public attention given to environmental hazards to be avoided during pregnancy. It is now suspected that many substances taken in by pregnant women may interfere with the normal development of their children. Researchers have produced cleft palates in animals by introducing chemicals, medications, radiation, insufficient oxygen, and overdoses and underdoses of vitamins, etc. at a critical time in the embryo's development.

It is very dangerous to generalize too freely in relating results of animal experiments to human problems, but the suggestion is clear that outside threats could contribute to inadequate formation of the face or palate. Although certain diseases a mother may contract during pregnancy are known to have possible serious effects on her child, there is so far only tenuous evidence of such diseases resulting in clefts. There is strong probability that some such relationship will eventually be found in a certain number of cases.

While reasonable caution and care are recommended in even the earliest stages of pregnancy (remember that the entire body plan and organs are completed within the first three months), the danger always exists that advice of this kind will make the mother of a child born with some defect feel that somehow she did not do all she could and the defect is evidence that she is to blame. Such assumption of guilt is not only pointless, but also unwarranted. The circumstances may involve genetic factors, half of which came from the father, or factors as far removed from immediate control as the natural and man-made elements in the water we drink and the air we breathe and the cosmic rays that strike us from outer space. It is virtually impossible at the present time to say specifically (except for some instances mentioned in the next section) why a particular child has a cleft. As more is learned, some clefts may be prevented in the future. Until that day, blame cannot be placed for ignorance existing in the past.

Is Cleft Lip/Cleft Palate Due to Anything Else?

Yes, at least two other possibilities exist.

One is mechanical forces that may delay or prevent a critical development stage until the appropriate time for uniting the parts of the palate has passed. These factors have nothing to do with pressures from outside the mother's body or positions that she may assume. The developing child is very well protected from such outside physical influences. An example of such a mechanical influence involves the child's tongue. Up to about the forty-fifth day of pregnancy, the tongue is between the shelves of tissue that will unite to form the palate. If the tongue does not drop out of the way in time, the palatal shelves may be

prevented from moving up and uniting until the appropriate time has passed. Then it is too late.

The other possibility is a chromosomal problem. The chromosomes carry the genes that hold the instructions for development of the body. Occasionally when the egg or sperm cell is formed, the process goes wrong and a particular sex cell winds up with an extra chromosome or a dislocated piece of chromosome. When this happens the instructions for creating the individual may result in a pattern of symptoms related to the abnormal chromosome. In some cases these symptoms include a cleft lip or cleft palate. Major medical laboratories are now able to determine a person's chromosomal pattern, and studies of this kind may be recommended if such a problem is suspected.

WHAT DOES IT MEAN TO HAVE A CLEFT PALATE OR A CLEFT LIP?

Parents' Comments

When a group of parents proposed discussing "What is a cleft palate?" the psychologist suggested that they begin by explaining what the term "cleft palate" or "cleft lip" meant to them.

The mother of a young baby said, "I think of the hole in the top of my baby's mouth that lets the milk come through his nose."

Another mother said, "When I think about a cleft lip, I can see the scar on Billy's face, and I think about how awful it looked before he had the operation."

A third mother said, "When I looked at our boy, I couldn't even think about him without saying to myself, 'He has a hole in the roof of his mouth!' I kept talking about this to my husband until one night he said, 'My God, Mary, can't you see there's a boy around that hole in the head! There's a boy who wants to crawl around and climb and be loved.' "

As a parent, you will be better able to help your child if you understand what it means to have a cleft lip or cleft palate or both. Some knowledge of how your lips and palate are made, what the parts are called, and how they work will make it easier to understand what your doctors explain to you and help reduce the fear that comes from hearing large words you may not understand.* One of the best ways to learn about lips and palates is to study your own with the aid of a mirror.

Normal Lips

First, look at your face with your mouth closed and your head tilted back slightly. You will notice two holes (the nostrils) through which the air enters your nose. These holes are separated from each other by a bridge of tissue that connects the tip of the nose with the upper lip. The sides of the nose curve around from the tip of the upper lip and make the outside boundary of the nostrils. The upper lip extends from beneath the nose to the point where the upper and lower lips meet at the angles of the mouth.

Notice that the lower part of the upper lip—the part on which women put lipstick—is red. It is covered by mucous membrane. At the center of the upper lip is an indentation running from the dividing strip between the nostrils to where the red and white parts of the lip meet. If you now run your tongue between the upper teeth and the upper lip, you will feel that the upper lip is separated from the upper gums and teeth. Between the outside skin and the mucous membrane on the inside of the lip are muscles that enable the lip to move and a person to eat, talk, smile, and whistle.

Clefts of the Lip

You will notice that your lip is all in one piece—a condition not true in the child who has a cleft lip, for this child's lip may appear to be in two or three pieces.

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*Many technical words commonly used by specialists are defined in the Glossary at the end of this booklet.

Clefts of the lip may occur on the right side, the left side, or both sides. Those clefts appearing on one side only are called unilateral, while those occurring on both sides are called bilateral. Clefts vary in extent. They may involve only the lower part of the upper lip, or they may extend from the lower border all the way to the nostril. Usually the cleft is through the outside skin, the muscles, and the membrane that lines the inside of the lips. The accompanying drawings illustrate the most common types of cleft lips.

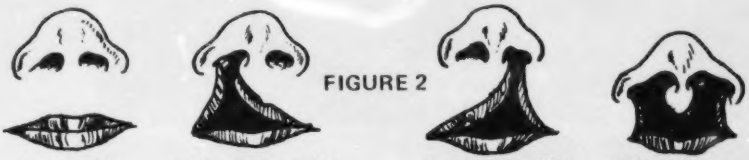


FIGURE 2

Normal lip | **Cleft of the right side of the lip** | **Cleft of the left side of the lip** | **Cleft of both sides of the lip**

Normal Palate

To see your palate and other parts of the inside of your mouth, open your mouth and tilt your head a little. In your mirror, you will see that your mouth is a large cavity with the tongue lying on the floor and the teeth arranged around the front and the sides. Sometime you may hear the specialists who are helping your child speak of the *premaxilla.* This word refers to that portion of the upper jaw that includes the four front teeth. The back of the mouth opens into the throat, which is technically called the *pharynx.* The top, or roof, of your mouth is called the *palate.* If you place your tongue behind your upper teeth and, while keeping your tongue against the palate, curl it backward, you will notice that the front part of the palate feels hard. Under the overlying tissues this part of the palate is made of bone and called the hard palate. If you continue to curl the tongue backward, it will come to the back part of the roof of the mouth, which is called the soft palate and is made largely of muscles. At the back end of the soft palate, you will see a teardrop-like projection called the *uvula.*

Note that while you breathe, the soft palate seems to hang down. Watch what happens when you say *ah-ah-ah,* pausing briefly after each syllable. The soft palate is pulled upward and backward by some of the muscles. Look again, directing your attention this time to the pharynx. You will see that the walls of the throat move in to meet the soft palate when you say *ah.* This combined movement of the throat and the soft palate enables a person to separate the mouth and the throat from the nose when talking and eating.

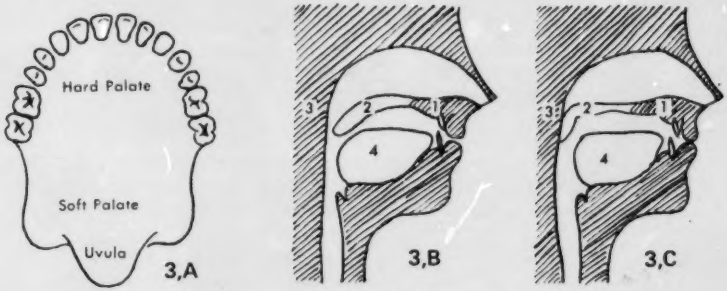


FIGURE 3

The drawings in Figure 3 illustrate the parts of the mouth and throat just described. Figure 3,A shows the several parts of the palate as they would be seen by a very tiny person standing on your tongue and looking upward. This is the part of the mouth across which you curled your tongue. Figures 3,B and 3,C represent cross sections through the head. In these side views, the numbers refer to the parts of the mouth mentioned earlier. Number 1 is the hard palate, 2 is the soft palate, 3 is the back throat wall, and 4 is the tongue. In Figure 3,B you see the soft palate (2) is hanging down, the walls of the throat (3) are relaxed, and the nose, throat, and mouth are connected. When we breathe, air enters the nose through the nostrils and passes between the walls of the throat and the soft palate into the throat and down into the lungs. The path is retraced by the air we exhale. In Figure 3,C you will note that the soft palate (2) has been drawn upward and backward and the throat wall (3) has been pulled inward to meet it, thus separating the nose from the throat and mouth. This separation keeps foods and liquids from entering a person's nose when eating and drinking and keeps sounds from going into the nose when talking.

Clefts of the Palate

We have often shown the four sketches of palates appearing in Figure 4 to parents of children with cleft palates and asked them which picture is most like their child's palate. From the sketch selected, parents can visualize why their child would have difficulty in separating his or her nose from the throat and mouth.

Palatal clefts vary in the degree to which the palate is involved. Four of the several types are shown in Figure 4. Figure 4,A illustrates a cleft of the soft palate only. Figure 4,B shows a cleft of the soft palate and part of the hard palate. In Figure 4,C the cleft involves the soft palate and all of the hard palate on one side. In Figure 4,D the cleft is on both sides of the hard palate. This figure also illustrates the premaxilla with the four upper front teeth. A child with any one of these clefts would have some difficulty in learning to talk and might have some difficulty in eating and drinking.

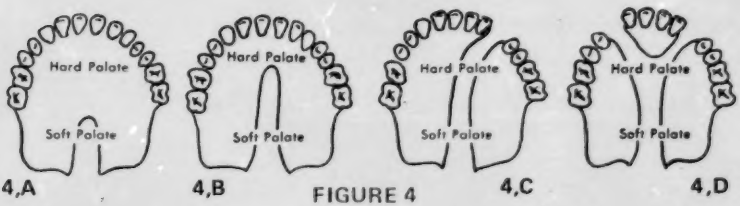


FIGURE 4

IS IT POSSIBLE TO REPAIR CLEFT LIPS AND CLEFT PALATES?

Parents' Comments

A mother once asked, "Isn't there some way that parents can get more information as soon as their child is born? After all, the baby does not need an emergency operation or anything like that, but, believe me, my husband and I needed help right away. We needed someone to explain how the baby could be made to look O.K. We were so upset that we didn't even want to take the baby home from the hospital until his mouth was operated on."

The psychologist said, "You didn't understand what could be done and you felt uneasy about taking your child home as he was."

The mother answered, "We didn't want our relatives and friends to look at Billy's mouth because we thought it looked—I hate to say it—but we thought it looked just awful. We were afraid, too, that we couldn't take care of a baby with a cleft lip."

If a child has a cleft lip or a cleft palate, parents, for many reasons, are quite anxious to have repair done as soon as possible. They are sometimes confused by hearing different opinions about the best ages for operations. It is important to remember that each child may have different needs related to factors such as weight and health as well as size and location of the cleft. Also, there are some differing professional opinions about timing and sequence of procedures.

The best guarantee of good treatment is qualified and experienced professional help. There are many very well-trained professional people available today, and parents need not settle for inexperienced assistance. Throughout the United States and in many other countries there are cleft palate (or craniofacial) teams, composed of plastic surgeons, various dental specialists, speech-language pathologists, and other professional workers who plan to carry out a total and long-range program of rehabilitation. To locate qualified people, contact local health departments, public health nurses, medical societies, dental societies, or the American Cleft Palate Educational Foundation. Your Easter Seal Society can assist you in finding help. Addresses of some of the organizations mentioned here and others that may provide assistance are listed on page 39.

Cleft Lips

The only way cleft lips can be repaired is through plastic surgery, and surgeons generally feel that the child should be doing well before an operation is performed. Any decision to postpone surgery should not be disturbing to parents because

repairing the lip is not an emergency. Babies can learn to eat quite satisfactorily with a cleft lip. While it is natural for parents to be anxious to have the lip repaired before family and friends see their baby, the child's health will not be endangered by leaving the lip open for a while. In fact, permitting the baby to gain weight and get a good start before undergoing an operation will usually be better for the baby's health.

The surgeon is concerned first about the safety of the operation and then about the appearance of the final result. Sometimes, because it is difficult to produce the best possible result working with the tiny structures of the young infant, the surgeon may suggest postponement until the baby is bigger. Where both sides of the lip are involved, or the tip of the nose or nostrils require special procedure, additional operations may be planned.

If it is difficult for you to understand how an operation can improve your child's appearance, the photographs on page 23 may help you envision the results a surgeon can obtain with different types of clefts. Photograph 1 shows an incomplete cleft before plastic surgery, and Photograph 2 shows the same child after surgery. Photographs 3 and 4 illustrate how a complete cleft on one side may be repaired, and Photographs 5 and 6 show how a complete cleft on both sides may be closed.

The amount of scarring is not always predictable; good postoperative care will often help minimize this problem. Immediately following the operation, scars will of course be obvious along the lines where the lip has been joined. As the child grows older, these scars will usually fade until, in many cases, they become barely noticeable. If the scar remains prominent, there are many things the surgeon can do to improve the appearance.

When the desired results cannot be achieved with the first operation, the surgeon will likely recommend a second operation on the child's lip at a later time. The purpose of the first operation is to bring together the separated parts of the lip in as good a relationship as possible. The objective of any

PHOTOGRAPH 1

PHOTOGRAPH 2

PHOTOGRAPH 3

PHOTOGRAPH 4

PHOTOGRAPH 5

PHOTOGRAPH 6

additional operation is to improve the appearance of the lip by correcting any unevenness that might remain.

In some children, distortion of the nose may be apparent following the lip surgery. The tip of the nose may be depressed and the *columella,* the bridge of tissue between the tip of the nose and the lip, may be short. Sometimes one or both *alae* (that is, the winglike sides of the nose that curve around the tip to the upper lip) may be flattened and not have a proper contour. In some cases, the bones inside the nose may interfere with proper breathing or detract from the child's appearance because they are not in their normal position. All these conditions can be improved through plastic surgery. Although some of these corrections can be made before the child starts school, surgeons feel that certain operations, particularly those involving the bones or cartilages of the nose, should be postponed until the child reaches teen age. This postponement will give the bony structure of the nose a better chance to grow. Operations on the nose are called *rhinoplasties.* If you hear that your child will need a rhinoplasty, it merely means that an operation designed to improve the appearance or function of the nose is recommended.

Cleft Palates

Clefts of the palate may be repaired by surgery or closed by a specially made dental appliance called a *prosthesis* or a *speech aid.* Frequently parents ask which of these methods is better. This question cannot be answered simply, for the procedure that might be better for one child would not be satisfactory for another. Among factors considered in deciding which of the procedures to employ in reconstructing a child's palate are the width of the cleft; the amount and quality of the palatal tissue available; the depth of the throat; the configuration of the bones in the area of the mouth, nose, and throat; and the muscular development in these areas. In many communities a team of specialists meets periodically at a cleft palate clinic to make careful study of each child before deciding which method to employ in closing the child's palate.

When plastic surgery is recommended the surgeon has many procedures from which to choose. All have as their objective a palate that will be closed completely and be long and flexible enough to separate the nose from the throat and mouth for talking and eating. The surgeon accomplishes these objectives by loosening and rearranging some of the tissues of the child's palate or tissues from the *nasal septum.* Photograph 7 shows a cleft palate before surgery, and Photograph 8 shows the palate after an operation.

PHOTOGRAPH 7

PHOTOGRAPH 8

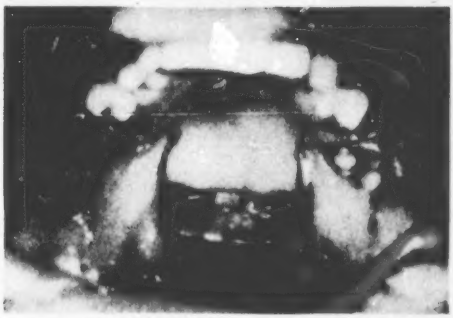
Sometimes after the first operation the palate still seems too short or the muscles do not work well enough. In such cases, after appropriate consideration of growth and speech training, an additional surgical procedure, such as a *pharyngeal flap operation,* or a prosthesis may be recommended. A cleft palate team can be very useful in making these decisions, which often involve the study of special x-rays or other specialized examination procedures.

Since all parts of the head may not grow evenly and at the same time, the throat closure can change gradually from good to adequate. This is one reason why a child who has had a cleft palate should be checked periodically until at least the middle-teen years.

If the specialists feel it would be difficult to obtain a satisfactory closure by surgery at any time, the cleft palate can be remedied through dental procedures somewhat similar to those employed in making an upper denture.

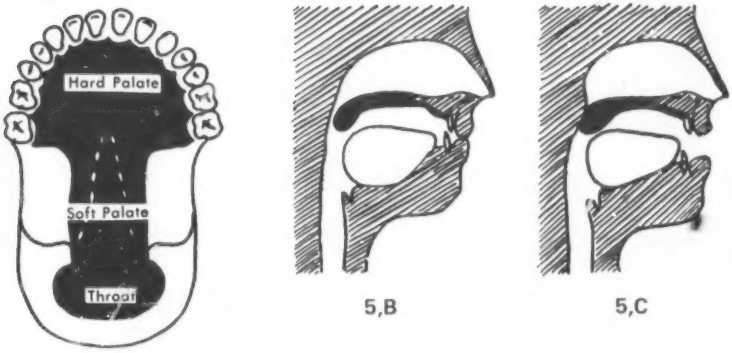
The dental method of reconstructing a cleft palate is illustrated in the accompanying photographs and drawings. Photograph 9 shows that the front part of a prosthesis, or speech aid, is something like an upper denture with a part extending from the back. Photograph 10 shows how it fits over the roof of the mouth and covers the cleft in the hard palate when one is present. The extension covers the cleft in the soft palate and extends into the throat. The appliance is held in place by clasps that fit around the teeth. When teeth are missing they may be added to the appliance. The drawings in Figure 5 show how a speech aid works.

PHOTOGRAPH 9



PHOTOGRAPH 10

In Figure 5,A the solid black area represents the speech aid, and the broken white lines show where the cleft in the palate would be. Note that the speech aid covers the cleft completely and that a portion of the speech aid projects into the throat.



5,A 5,B 5,C

FIGURE 5

As Figures 5,B and 5,C show, the walls of the throat do not touch the speech aid, permitting free and easy breathing through the nose. You will recall from your mirror study of your mouth and throat how your throat moved in toward the soft palate when you said *ah*. The same thing happens when a person wears a speech aid except that instead of meeting the soft palate, the throat walls come into contact with the speech aid to separate the nose from the throat and mouth for eating and talking.

Speech aids can be made for children as soon as they have sufficient teeth to support them. Many children have now been fitted with speech aids at two-and-a-half and three years of age. Speech aids are usually made of light plastic material and are easy to remove and clean after eating. They are changed about every two years to keep pace with the child's growth and development. Sometimes the specialists consider it advisable for a child to use a speech aid when young and have surgical repair of the palate when older.

Many times repair of a cleft is achieved through both surgery and dental appliance use. Occasionally a prosthesis is prescribed until a child is ready for additional surgery. When surgeons and dental specialists work together as a team maximum flexibility and coordinated planning are possible.

WILL THE CHILD HAVE TROUBLE EATING?

In addition to concern about the child's appearance, parents may have fears about possible feeding problems. In discussion groups some parents have reported being advised to use a feeding device that squirts the milk into the baby's throat, others have described their distress at seeing milk run from the baby's nose, others have told of their long search for special nipples. At one meeting an experienced mother said, "You are all making this feeding business too complicated. All you need is a soft nipple with large holes. Then hold the baby in a sitting position when you give him the bottle. If he is lying down like other babies, the milk will naturally run into his nose and out his nostrils." She had the right idea. A clinic that kept a careful record of the feeding of two hundred babies with cleft palates found that only three presented any feeding problems.

Of course every child is different. Even children who have no problems with their mouths differ in the ease of feeding and create concerns for mothers. With breast-feeding becoming more common in the United States, the fact that most children with clefts have difficulty nursing at the breast will undoubtedly distress some mothers of these children. A pediatrician experienced in working with children who have clefts can be helpful when feeding problems occur.

Lip clefts alone rarely create a problem; generally speaking, most children with palatal clefts need only minor modifications of bottle-feeding techniques. A large-hole or cross-cut nipple often solves the feeding problem. Using compressible milk containers—specially designed plastic bags rather than rigid glasses—will enable the parent to keep the milk under gentle pressure. When the child is held in a rather upright position, gravity will direct the milk down the throat rather than out the nose. Although these suggestions can be followed by using inexpensive equipment that is available generally, cleft palate nursers can be purchased. Other special devices recommended in the past are not needed and, in fact, may be less satisfactory in practice.

CAN CHILDREN WITH CLEFT PALATES LEARN TO TALK?

At a cleft palate clinic parents of children with cleft palates are asked routinely, "Can you tell what you are concerned about most—what you are worried about more than anything else?" Most frequently parents of young children are worried about how their children will talk.

A mother said, "Speech is so important in our lives. Almost everything everyone does requires the ability to speak. A child who can't be understood is in real trouble. I think we ought to make our children speak clearly as soon as they start to talk."

Another mother said, "How can you do that? Even normal children don't speak clearly at first. Talking is just like walking or anything babies learn. I don't think we should try to make a child with a cleft palate speak clearly at first—especially before the cleft palate is fixed. If you keep insisting that every word be pronounced right, you'll just make a self-conscious, unhappy child who won't want to talk and won't find it fun to tell you things."

Difficulty with speech has been one of the most serious results of cleft palate. Cleft of the lip alone rarely produces a noticeable speech problem, but palatal clefts make production of many speech sounds difficult. A brief description of how people speak may help promote understanding of why children with cleft palates have difficulty talking.

Speaking takes place on the air we breathe out. Ordinarily we breathe in and out at a regular rate. When we talk, however, we inhale in a slow, controlled way. The outgoing airstream passes through the *larynx,* or voice box, where, for the production of some sounds, a tone is added to the airstream by the vibration of the vocal folds. From the larynx the air is directed into the throat. If the soft palate and throat walls are not pulled together, the sound from the throat will enter the nose. This is the way we make the sound of *m* as in *man, n* as in *no,* and *ng* as in *sing.* By placing your fingers on your nose, you can feel the vibrations as you hum the *mmm* sound, for example. If you pinch the nostrils together as you make *m, n* or *ng,* the tone will

change because the sound can't get through the nose. These are the only English speech sounds made with the throat opening directly into the nose. For all others, the soft palate and throat walls work together to block off the nose so that the air and sound will be directed into the mouth.

In the mouth, for some sounds, the air is blocked momentarily by the lips or tongue and then released with a little explosion to make noises such as the *p* in *pop*, the *t* in *tie*, or the *k* in *key*. Persons who have cleft palates find sounds difficult to make because they cannot develop the pressure in their mouths to produce the little explosion. The air leaks through their palates and out through their nostrils instead. Other sounds such as the *s* in *sun*, the *sh* in *shoe*, and the *f* in *fire*, for example, are made by forcing the air under the pressure through small holes between the tongue and palate, the tongue and teeth, or the lips and teeth. Again, these sounds are often difficult for children with cleft palates, who cannot develop the necessary air pressure in their mouths. Not until the palate has been reconstructed can a child learn to make those sounds properly.

Some studies have found that the speech of many children with cleft palates develops later than average. This finding needs a little explanation. When we consider speech, we think not only of the sounds that are made, but also of the words that are used, the structure of the sentences or phrases, and the ease of understanding. It should be emphasized that there is no reason for a cleft palate by itself to interfere with the development of language and that actually most children who have been considered late in starting speech have caught up quite satisfactorily.

Obviously if we judge speech on the basis of what we can understand, the child with an untreated cleft palate will be harder to understand than the average child; some may think the child is not really talking. In addition, children have to learn to talk, and the opportunities to do this may be somewhat different for a child with a cleft. For example, some parents have experienced reluctance to encourage speech as long as the palate is unrepaired for fear of instilling speech of poor quality. Speech involves a person-to-person relationship. Parents are stimulated to talk by their child's speech and reactions, and the

child is stimulated to talk by the parents' example and encouragement. When any of these relationships breaks down, speech development may be delayed.

The best general advice for parents interested in helping their child with cleft to develop speech is: Encourage and stimulate speech just as you would for any child, but do not expect the same precision in the sounds and do not press the child to make the sounds more clearly. Certainly talk with your child, name things, share experiences, look at books together. Be pleased with the youngster's attempts to talk. Children with cleft palates, like any other children, do not know they cannot be understood clearly unless they are constantly reminded. Try your best to understand what your child is trying to say. Say the words correctly for the child, but do not imply by your manner that the child's pronunciation was "wrong." By pressing too hard for clearer sounds you may either discourage further attempts or encourage the use of other, less suitable, ways of saying the sound, which will have to be remedied later. Understand why the child has difficulties with some of the sounds. Some fathers, for example, have expressed disappointment because a child can say *mama* but says *nana* instead of *dada*. It will help to understand that the nasal sounds of *m* and *n* are very easy for a child with an open cleft, but that *d* is very hard to say and turns into an *n* when the nasal cavity cannot be sealed off.

Learning to speak is complicated, and many things not directly connected with cleft could interfere with the learning process. When speech development is delayed, evaluation by a speech-language pathologist, audiologist, and psychologist might be indicated. For example, it may be important to check your child's hearing, general learning rate, or personal adjustment.

After the palate is repaired, the speech specialist may suggest some speech training activities for parents to carry out at home. The experience of many cleft palate centers indicates that for some children no speech training will be necessary, although some parents and even some speech-language pathologists find this hard to believe. Children cannot be expected to speak normally as soon as the palate has been closed surgically or a speech aid provided. It is important to remember that correct

pronunciation of speech sounds develops gradually over a period of several years. The average child does not produce all speech sounds accurately and consistently until about seven or eight years of age. It may take longer for the child with a cleft palate to learn to make all the sounds. However, with adequate help, many children with cleft palates are speaking as well as their classmates when they enter school. Practically all children with cleft palates can develop easily understood speech, and many will develop normal speech.

After the palate has been repaired, parents can encourage speech improvement. Whenever possible, this help should be supervised by a properly trained speech-language pathologist. Some fifty thousand of these specialists now work in the United States in public and private schools, hospitals, health departments, clinics, and private practice. The organizations and agencies listed on page 39 can help you find a speech-language pathologist who is qualified.

IS A CHILD'S INTELLIGENCE AFFECTED BY A CLEFT PALATE?

In a discussion of the mental abilities of children born with cleft lips and cleft palates, a father reported bitterly, "A man at the shop told me that he knew a fellow with a cleft palate who couldn't finish fourth grade. He said this man couldn't get a job and someone had to look after him all his life."

A mother said, "A woman told me and my husband, 'When the face ain't right, the mind don't grow right either.'"

The psychologist asked, "Have any of you ever known children with cleft palates who get along well in school or adults with cleft palates who have good jobs?"

A father said, "Look at the kids who are around the clinic today. Most of them look plenty smart to me!"

A few investigators have suggested that the average I.Q. of children with cleft palates is slightly below that of the general

population; however, below-average intelligence is not to be expected just because a child has been born with a cleft. Children with clefts may be bright, average, or dull—just like other children. Again, all children are individuals, and consultation with an experienced psychologist should help parents resolve any questions they may have about their child. Children with clefts get along about as well in school as other children of comparable mental ability. After school they find careers in a variety of occupations. Among persons we know who have clefts are physicians, dentists, nurses, a public relations expert, secretaries, a beautician, an actor, a mechanical engineer. . . and several speech pathologists. Having a cleft need not be an educational or a vocational handicap.

DO CHILDREN WITH CLEFT PALATES HAVE HEARING LOSSES?

Most people experience a feeling of fullness in their ears as they drive up a mountain road. As they descend the other side their ears seem to "crack" and then feel all right again. Sometimes this "fullness" can be overcome by swallowing. The feeling occurs because air pressure decreases near the mountaintop, causing the air inside the middle ear to push outward on the eardrum. Swallowing opens the *eustachian tube,* which connects the middle ear with the nose and throat, and the air pressure on both sides of the eardrum is equalized.

Some doctors think most children with clefts of the palate have problems related to the eustachian tube. The end of the tube, located in the throat, is exposed to irritation and infection as the result of rubbing by the tongue and by food. The tube, in some children with palatal clefts, narrows in places, restricting the passage of air to and from the middle ear and sometimes interfering with normal drainage. Muscles anchored in the palate and structured to pull the tube open for equalizing pressure cannot work effectively when the palate is cleft. As a result, youngsters with clefts are more inclined to have middle ear problems called *otitis media.* Some of these problems involve

infections with drainage, pain, and fever, but many are not infectious and relate only to poorly balanced air pressure inside and out.

It is important for parents to understand that both the infectious and noninfectious types of otitis media can produce disabling hearing losses. Hearing loss can be prevented in most cases if the otitis media is treated early by an *otologist* or an *otolaryngologist.* Since children do not always complain about ear problems and may be unaware of what they miss, it is advisable to have the child evaluated by an *audiologist.*

A common treatment for otitis media involves insertion of tiny tubes through the eardrum. Since the eardrum separates the middle ear from the outside air, these tubes permit the air pressure to be equalized even when the eustachian tube is not working properly. This treatment, when recommended by the doctor, can be done quickly and relatively painlessly, often resulting in dramatic improvement in hearing. Nothing is visible from the outside, and the main problem is keeping water out of the ear.

Because the *adenoid* tissue is close to the throat end of the eustachian tube, some doctors believe that removal of the adenoids may help the tube to function. However, parents are advised to discuss any recommendation of this kind with the surgeon who has repaired the palate or with the speech-language pathologist in order to determine the effect that removal of the adenoids may have on the child's speech.

Despite the frequency of hearing problems, the outlook is usually optimistic. With appropriate treatment, most children who have hearing problems related to clefts can preserve normal hearing through the school years and generally have little need

for further treatment later. Eventually even tubes required in the ears may no longer be necessary.

DO CHILDREN WITH CLEFT PALATES HAVE TROUBLE WITH THEIR TEETH?

"Is there any way to keep children with cleft palates from getting ugly, twisted teeth?" asked a mother at a discussion session.

Specialists may speak of a child's *malocclusion* (teeth that do not close properly) and may recommend orthodontic treatment. An *orthodontist* is a dental specialist who straightens teeth and corrects improper occlusions. Today many children wear braces to straighten their teeth; many more probably should. Dentists have estimated that from one-fourth to one-half of the population has some degree of malocclusion.

Crooked teeth and other types of malocclusion are more common in children with cleft palates, especially if the cleft extends all the way through the upper jaw. Often the teeth are merely twisted, but sometimes they erupt in poor positions; occasionally one or more teeth may be missing. If teeth are well cared for, contemporary dentistry can do much to improve appearance as well as provide good dental relationships for chewing and talking.

Parents should see that the child's teeth are cleaned regularly and that all cavities are filled promptly. This is especially important for children who will be fitted with speech aids, which anchor to the teeth. An awareness that teeth are essential to good health is necessary as is the understanding that missing or poorly positioned teeth may contribute to poor speech and that incidence of dental disease among children with clefts runs high. A *pedodontist,* found and seen early, can contribute greatly to an overall dental plan.

HOW DO CLEFT PALATES AFFECT CHILDREN'S PERSONALITIES?

At a meeting of a parents' group, a father asked, "How are we going to keep our boy from becoming embarrassed and feeling inferior to everyone else?"

A mother said, "Parents cause problems, too. Someone was telling us about a girl with a cleft lip whose mother told her that she got the scar from a fall when she was learning to walk. When she was in the sixth grade the girl met another child with a cleft lip and was very upset when she learned that her parents had not told her the truth about it. They thought they were protecting her feelings, but they were making things more difficult. I think the best way to prepare our children for life is to talk with them about their problems and tell them the truth."

Many parents have expressed concern about the effect a cleft lip or palate might have on the development of their child's personality. While one might expect that emotional problems would result from having a cleft, actual studies of the personalities of children with clefts show that, as a group, they are as well adjusted as other children.

Probably of greater importance than the cleft in determining a child's emotional adjustment is the way the parents work out their feelings toward it. An understanding of these feelings—their beginnings and how they grow—will help parents direct their feelings into wholesome channels.

Few parents are prepared for the birth of a child who is different from other babies in some important way. It is no wonder that so many parents report being shocked and confused upon learning of their child's condition. As a father once said, "There are a million things to think about when you learn of your child's handicap." Feelings of confusion develop any time one has too many questions to answer at once or when one doesn't know which of many things to do next. Confusion comes naturally from lack of information about the child's problem and the absence of a directed treatment program. Usually this

feeling disappears as the child progresses in the treatment program.

At a parent meeting, one of the fathers asked, "Do parents ever get over the feeling of disappointment that their child is not normal?"

While feelings of disappointment are quite natural, they can harm a family relationship. If these feelings are not understood they can grow deeper and deeper and prevent the development of warm, loving feelings toward the child. As one father said, "Whenever I tried to play with my boy, I felt there was a barrier between us. Pretty soon I was having trouble being nice to him. When I discovered that my own disappointment was getting in the way, the boy and I got along well."

Many families have described the embarrassment they experience when asked about the child who has a cleft. One mother stated the problem rather clearly when she said, "I just seem to go to pieces inside me when I think of having our relatives—or anyone else—see our child."

Parents have often commented on the embarrassment they feel when their friends express pity or sympathy toward the child. One father said, "Even though it's said with the best intentions, I feel embarrassed when anyone says, 'I certainly feel sorry for you folks.' "

Again, many parents have found they can best manage these situations by talking objectively about cleft palates and what can be done for children who have clefts today. A father made this point in a group discussion session when he said, "I think one of the best things we can do for our children and for all other children who have handicaps—and ourselves, too—is to be prepared to turn those embarrassing situations into opportunities for educating the public."

Feelings of embarrassment not understood and directed into wholesome channels may lead to hostility toward people, sometimes even toward professional workers who are helping the child.

Concern about the welfare of a child who has a handicap is a

natural reaction. Parents worry not only about physical pain the child may experience, but also about how the child will get along with people and get along in school and what kind of job the child will be able to hold as an adult. The anxieties that may develop from these natural concerns can result in over-solicitousness and overprotection, which will rob a child of opportunities for developing independence.

Instead of trying to protect children from teasing, parents might better help them learn how to accept teasing. Family discussion of what to expect at a clinic visit will help reduce a child's anxieties about the visit. When parents learn about clefts, they realize that children with cleft lips and cleft palates can expect to lead happy, useful lives.

Many babies are born in the United States each year, and some of them will have cleft lips, cleft palates, or both. For these babies, the future is, indeed, bright. Advances in surgery have made it possible to obtain good-looking lips, and many palates may be made to function adequately by surgical procedures. Dental techniques have been developed for reconstructing by prosthetic means those palates that cannot be repaired surgically. Speech-language pathologists know how to help children with cleft palates develop good speech.

Yes, with professional help from specialists and understanding guidance from parents, children born with cleft lips or cleft palates have a bright future.

SOURCES OF INFORMATION

In addition to local health departments, medical societies, and dental societies, the following agencies and organizations can assist you in finding qualified help for children who have cleft lips and cleft palates:

National Easter Seal Society
for Crippled Children and Adults
2023 W. Ogden Avenue
Chicago, IL 60612
or the
Easter Seal Society in your state or community

American Cleft Palate Educational Foundation
University of Pittsburgh
331 Salk Hall
Pittsburgh, PA 15261

American Speech-Language-Hearing Association
1801 Rockville Pike
Rockville, MD 20852

Crippled Children's Services
Office of Maternal and Child Health
Department of Health, Education, and Welfare
5600 Fishers Lane
Room 7-15, Parklawn Building
Rockville, MD 20852

GLOSSARY

ADENOID: A mass of spongy tissue at the top of the throat above the level of the palate. Like the tonsils, the adenoids normally enlarge in childhood then shrink and disappear during adolescence.

ALA (Plural—ALAE): The Latin word for "wing." This descriptive term is applied to many "winglike" parts of the body. On the nose, it means the outer curved side of the nostril.

ALVEOLAR RIDGE: The part of each jaw holding the teeth.

ALVEOLUS: Meaning literally the socket that holds a tooth, but used by many doctors to mean the whole structure (alveolar ridge) running around the jaws and holding all the teeth.

APPLIANCE: A general term used often to refer to a dental device in cleft palate rehabilitation. More formal terms may be *prosthesis* or *obturator.*

ARTICULATION: In speech, meaning the production of speech sounds of the language, including the *consonants* and the *vowels,* referring generally to the oral activity (of lips, tongue, jaw, and soft palate) used to produce the sounds of the language.

AUDIOLOGIST: An expert in the testing of hearing and the selecting of hearing aids and other nonmedical and nonsurgical procedures to help persons who have hearing impairments. Qualification is indicated by holding the Certificate of Clinical Competence in Audiology issued by the American Speech-Language-Hearing Association.

BULB: The rear part of a cleft palate prosthesis (the part that fits into the throat). Often referred to as the "bulb" because of its shape.

CHROMOSOME: One of the forty-six structures in the human cell that carry the genes with their information about how the body will be formed.

CINEFLUOROGRAPHY (Also called CINES, for short): A procedure for making x-ray pictures in motion. Used only to study the internal parts of the mouth and throat during speech, especially the soft palate and pharyngeal walls. Cinefluorography typically uses much weaker x-rays than are needed to expose a photographic film, so radiation exposure over the longer period of time is relatively little. The true "cine" is recorded on motion picture film, but many people are now recording the images on TV tape and calling the process *videofluorography*.

COLUMELLA: The "little column" of tissue under the nose and between the nostrils. The columella is the lower end of the *nasal septum.*

CONGENITAL: A condition present at birth, either inherited or developed during pregnancy.

CONSONANTS: Speech sounds made with partial or total blockage of the air passage. Plosives (p,b,t,d,k,g) have the passage completely blocked so air pressure can be built up and exploded. Fricatives (f,v,th,s,z,sh, etc.) have the passage narrowed so air must be forced through a small space with a friction sound. Nasals (m,n,ng) have the passage blocked at some points in the oral cavity so the sound passes through the nose.

DENASALITY (HYPONASALITY): Voice quality characterized by lack of needed nasal resonance and sounding as if the person has a cold. Usually the nasal consonants (m, n, and ng) are affected, but under some conditions all the sounds of speech may be distorted.

EUSTACHIAN TUBE: A narrow passageway connecting the middle ear with the nose and throat and permitting equalization of the air pressure on both sides of the eardrum. (See TYMPANIC MEMBRANE.)

FRICATIVES–See CONSONANTS.

GUM RIDGE–See ALVEOLAR RIDGE.

HARD PALATE: The front two-thirds of the roof of the mouth, called "hard" because the underlying structure is bone.

HARELIP: An old term meaning "cleft lip." Since its derivation ("lip like a hare") is inaccurate and the connotation objectionable, the term should no longer be used.

HEARING LOSS: Reduction in ability to hear normally. There are two large general categories of hearing loss: Conductive and sensorineural. Conductive indicates some problem in getting the sound into the inner ear, where it is changed to nerve impulses. Sensorineural indicates a problem in the inner ear receptor, or the nerves carrying the message to the brain.

HYPERNASALITY–See NASALITY.

HYPONASALITY–See DENASALITY.

LARYNX: The "voice box" in the throat, located at the top of the windpipe, where voice is produced when air passes between the vocal cords. The larynx also serves as a valve to prevent foreign materials from entering the lungs.

LEAK: A term used by some members of a cleft palate team to mean that air is escaping ("leaking") into the nose during speech.

NASAL EMISSION: Air flowing through the nose during speech, possibly causing unpleasant or distracting noises or merely cutting down the air pressure needed in the mouth for the correct production of some consonants.

NASAL SEPTUM: The partition that divides the nasal cavity into right and left sides. If the septum deviates from normal alignment ("deviated septum"), it may block the airspace in the nasal cavity.

NASALITY: The voice quality resulting from resonation in the nasal cavity and occurring in the normal production of m, n, and ng. Too much nasality on vowels (hypernasality) calls attention to the speech and is often considered undesirable or unpleasant. (See DENASALITY and NASAL EMISSION.)

OBTURATOR: A general term referring to an artificial device used to close a hole. The term is sometimes applied to all or part of the artificial palate made by a dental specialist to help the person who has cleft palate. (See PROSTHESIS and SPEECH AID.)

OCCULT CLEFT—See SUBMUCOUS CLEFT.

ORTHODONTIST: A dental specialist concerned primarily with the proper location of teeth in the jaws and their relationship to each other. As a member of a cleft palate team, the orthodontist may be responsible for moving teeth or even parts of the jawbone.

OTOLARYNGOLOGIST (E.N.T.): A physician specializing in the diseases of the ear, nose, and throat.

OTOLOGIST: A physician with a specialty in ear problems.

PALATAL LIFT: A form of dental device like a cleft palate prosthesis that supports ("lifts") the soft palate from below to assist it in making velopharyngeal closure.

PASSAVANT'S PAD: A shelf-like projection of the rear wall of the pharynx seen in some individuals with velopharyngeal incompetencies, which may help compensate for difficulty in achieving closure.

PEDODONTIST: A dental specialist concerned primarily with care and treatment of children's teeth, particularly those with special problems.

PERFORATION: A term often used in referring to a hole that develops in the postoperative palate.

PHARYNGEAL FLAP OPERATION: A surgical procedure in which a wide band of tissue from the back wall of the throat is attached to the soft palate, thus separating the nasal and pharyngeal cavities except for spaces between the band of tissue and the walls of the throat on each side. Closure of these remaining openings during speech is usually produced by movement of the side walls of the throat.

PHARYNX: The throat behind the oral and nasal cavities and above the larynx.

PLOSIVES—See CONSONANTS.

PREMAXILLA: The front of the palate, containing the four incisor teeth. The premaxilla develops embryologically from different tissue than the rest of the palate. Failure of the premaxilla to unite with the other portion of the hard palate may result in clefts through the gum ridge on one or both sides.

PROSTHESIS: An artificial device used to replace a missing part of the body. In cleft palate rehabilitation the term usually refers to an artificial palate made by a dental specialist and designed to help with swallowing and speech. (See OBTURATOR and SPEECH AID.)

PROSTHODONTIST: A dental specialist in the area of artificial replacements for missing structures (prostheses). On a cleft palate team, the prosthodontist may make prostheses that do the work of some or all of the hard and soft palate.

RHINOPLASTY: Rhino is a Greek word meaning "nose," and rhinoplasty means an operation to change the shape of the nose. Other words with the prefix *rhino* are rhinitis (infection of the nose or nasal cavity) and rhinolalia (speech with defective nasal resonance.)

SOFT PALATE—See VELUM.

SPEECH AID: A term used by some members of the cleft palate team as a synonym for a cleft palate prosthesis.

SPEECH-LANGUAGE PATHOLOGIST: The term now accepted as the formal name for specialists trained to assist persons with speech and language disorders. Most working in public and private clinics and hospitals have the Certificate of Clinical Competence in Speech issued by the American Speech-Language-Hearing Association. In addition, speech-language pathologists are licensed in more than twenty states. Either of these credentials should indicate that the speech-language pathologist has proper training.

SUBMUCOUS CLEFT: A deficiency of tissue under the normal mucous membrane covering the palate. (Since it is not seen, it is also sometimes called an occult cleft.) A palate may look whole, but if there is an absence of bone in the hard palate or muscle tissue in the midline of the soft palate, it is described as a submucous cleft.

TERATO-: A prefix that refers to congenital malformations. Teratology would be the study of such problems, and a teratogen would be an agent that produces such problems.

TONSILS: Masses of spongy tissue on both sides of the throat at the back of the mouth. Normally these enlarge greatly during childhood then shrivel up during adolescence. (See ADENOID.)

"TUBES" (TRANSTYMPANIC TUBES): Small plastic tubes inserted through the eardrums to equalize air pressure in the middle ear when the eustachian tube is blocked.

TYMPANIC MEMBRANE: Tissue separating the middle and outer ear.

UVULA: The teardrop-shaped tissue hanging down from the rear of the soft palate at the back of the mouth. When only the uvula is cleft, a "bifid uvula" is said to be present.

VELOPHARYNGEAL INCOMPETENCE: The term used to indicate a failure of the velopharyngeal tissues to meet in closing the passage between the nasal cavity and throat. The condition may be due to insufficient tissue, paralysis, or other factors. Velopharyngeal incompetence may be present after cleft palate surgery, but also appears in individuals who never had a cleft.

VELOPHARYNX: The area where the soft palate (velum) and throat (pharynx) come together to block the passage from the throat into the nasal cavity.

VELUM (SOFT PALATE): The back third of the roof of the mouth, composed mainly of muscle, which is raised to meet the back wall of the throat (pharynx) during production of nonnasal speech sounds and swallowing.

VIDEOFLUOROGRAPHY—See CINEFLUOROGRAPHY.

VOMER: A bone, part of the nasal septum, that is perpendicular to the palate and meets it in the midline. In some surgical procedures (vomer flap operation) part of the tissue from this structure is used in repairing the hole at the front of the palate.